



**CHAPTER 2**

# **MAGNITUDE AND CONTROL OF ARI IN LIGHT OF THE GOALS OF THE WORLD SUMMIT FOR CHILDREN**

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## **I. INTRODUCTION**

**A**ctions that have been proposed for the control of acute respiratory infections (ARI), in health service centers and the home, could contribute to as much as an 80% reduction in the mortality resulting from this group of diseases. The World Summit for Children set a goal for the year 2000 to reduce ARI-related mortality by 30% from the level of 1990. To ensure that this goal is met, the control of ARI through standard case management within the framework of integrated management of prevalent childhood illnesses will remain the most critical strategy for the remainder of the 20th century. Implementation will require intensive efforts from every country in the Region and in particular from personnel involved in activities at the local level.

Moreover, personnel responsible for performing these activities need to familiarize themselves with the key indicators regarding the magnitude of the problem in the Region and the many reasons why ARI continues to constitute a health problem for the children of developing countries. These reasons are rooted in the prevalence of risk factors for disease and severity, cultural patterns, and people's access to appropriate health care (1).

Many of the annual deaths of children under 5 years of age in the Region of the Americas are caused by ARI. The single greatest cause of death is from pneumonia, which is responsible for 80 to 90% of the mortality from ARI in the Region.

## **II. MAGNITUDE OF THE MORTALITY FOR ARI IN THE REGION OF THE AMERICAS**

### **a) Official indicators**

The most recent information available on mortality in children under 5 indicates that in the most extreme case (Guatemala) pneumonia and influenza may cause up to 33% of all deaths in children under 1 year and up to 27% in children between the ages of 1 and 4 (Table 1). The importance of these two diseases in overall mortality is in stark contrast with the situation observed in the industrialized countries of the Region (Canada and the United States), where pneumonia and influenza account for under 2% of the deaths in children under 1, and 3% of the deaths of children ages 1 to 4 (2).

Clearly, reported mortality from pneumonia and influenza in children under 1 year is far higher in developing than in industrialized countries (Figure 1). In 1993, in Guatemala for every 100,000 live births there were 1,439 deaths before 1 year of age due to these diseases, whereas in Canada there were only 6.

The situation is similar in other developing countries in the Region—such as Peru, Paraguay, Nicaragua, Mexico, and Ecuador—where for every 100,000 live births between 200 and 500 children die from pneumonia and influenza before they can complete their first year.

Pneumonia and influenza also account for much of the mortality in children between the ages of 1 and 4 years. In 1993 in Guatemala 211 of every 100,000 1- to 4-year-olds died from these diseases, as compared to Canada in 1992, where the rate is only 1 of every 100,000 (Figure 2).

The great differences in the mortality from pneumonia and influenza can be illustrated by making a historical comparison between the industrialized countries and developing countries in the Region.

In the United States and Canada, for example, mortality from pneumonia and influenza in children under 1 was above 1,000 for every 100,000 live births prior to 1940, and there were approximately 250 deaths per 100,000 live births until the mid-1960s.

Thus, children under 1 year in the developing countries of the Region currently are at risk of mortality from pneumonia and influenza to a degree that newborns in the industrialized countries of the Region have not faced for 30 years or more.

### **b) Estimates**

The figures above, although based on the latest available information, do not reflect the real magnitude of the situation. The underreporting of mortality in children less than 5, added to the problems that originate in certification and codification of the cause of death, mean that many deaths of children of this age from pneumonia and influenza have not been included in the available figures.

Underreporting of mortality in children under 1 year of age may reach 200%, which would mean that this kind of infant mortality may be as much as 3 times higher than what official statistics indicate (Figure 3).

**Table 1.** Mortality from pneumonia and influenza in children under 5 years of age.<sup>1</sup> Countries of the Americas. Latest available information.<sup>2</sup>

COUNTRY	LESS THAN 1 YEAR				ONE TO 4 YEARS			
	Year	No.	Rate <sup>3</sup>	% <sup>4</sup>	Year	No.	Rate <sup>5</sup>	% <sup>4</sup>
ARGENTINA	1994	560	83.11	3.78	1993	190	6.94	7.89
BAHAMAS	1990	13	212.52	8.72	1990	1	4.77	4.76
BARBADOS	1992	2	47.79	3.51	1992	0	0.00	0.00
BELIZE	1989	5	113.38	4.63	1989	7	41.87	24.14
BRAZIL	1993	5,534	152.00	12.64	1991	2,538	18.11	16.74
CANADA	1992	26	6.52	1.07	1992	14	0.90	2.90
CHILE	1994	368	127.72	10.70	1993	82	6.75	11.34
COLOMBIA	1991	1,367	152.68	10.64	1991	575	17.53	14.25
COSTA RICA	1994	48	59.71	4.59	1994	16	5.04	8.12
CUBA	1995	87	59.23	6.29	1995	26	3.68	6.24
DOMINICA	1985	2	117.40	6.25	1985	0	0.00	0.00
DOMINICAN REPUBLIC	1995	141	151.73	7.37	1995	48	5.83	12.44
ECUADOR	1994	742	250.91	21.05	1994	417	36.40	15.16
EL SALVADOR	1990	254	171.20	6.86	1990	115	13.20	9.32
FRENCH GUYANA	1984	1	41.50	2.00	1984	0	0.00	0.00
GRENADA	1988	1	49.26	6.67	1988	0	0.00	0.00
GUATEMALA	1993	4,206	1439.14	33.42	1993	3,005	210.85	26.62
HONDURAS	1981	222	137.00	6.00	1981	152	28.63	6.01
JAMAICA	1985	104	179.31	9.78	1985	36	16.51	8.72
MEXICO	1994	7,687	264.70	15.42	1994	1,669	18.64	15.66
MONTSERRAT	1990	0	0.00	0.00	1990	-	-	-
NICARAGUA	1995	178	291.74	9.22	1995	146	24.70	23.97
PANAMA	1993	77	130.09	6.97	1993	32	13.25	11.07
PARAGUAY	1993	308	399.43	16.13	1993	174	31.41	22.66
PERU	1992	3,275	525.77	23.20	1992	1,329	38.76	24.39
PUERTO RICO	1992	20	29.50	2.40	1992	5	1.60	4.30
ST KITTS & NEVIS	1991	0	0.00	0.00	1991	1	21.14	16.67
ST LUCIA	1991	1	26.77	1.49	1991	1	6.25	1.27
ST VINCENT & GRENADINES	1991	3	115.79	5.26	1991	0	0.00	0.00
SURINAME	1991	4	36.36	3.54	1991	7	15.91	17.07
TRINIDAD & TOBAGO	1991	23	102.83	9.31	1991	9	7.56	13.24
UNITED STATES	1991	607	14.77	1.65	1991	207	1.07	2.87
URUGUAY	1994	66	106.10	6.30	1993	17	8.20	9.50
VENEZUELA	1993	875	166.86	7.00	1993	326	14.83	12.46

1 As corresponds to codes 480-487 of the International Classification of Diseases, 9th Revision (ICD-9).

2 Latest information communicated by authorities responsible in each country for ARI to the ARI/CDD (Control of Diarrheal Disease) Unit of PAHO/WHO, Washington, D.C.

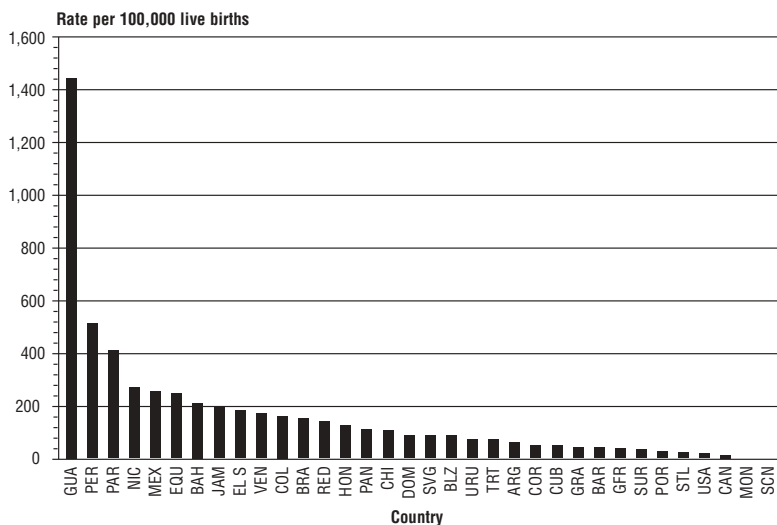
3 Rates per 100,000 live births.

4 Percentage of total deaths from all causes.

5 Rates per 100,000 persons from 1 to 4 years.

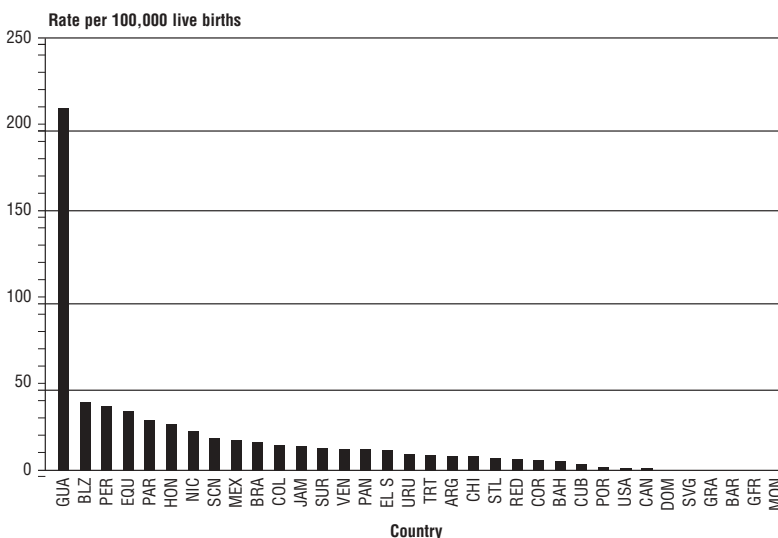
- No information available.

**Figure 1.** Mortality from pneumonia and influenza in children under 1 year of age. Countries of the Americas. Latest available information.



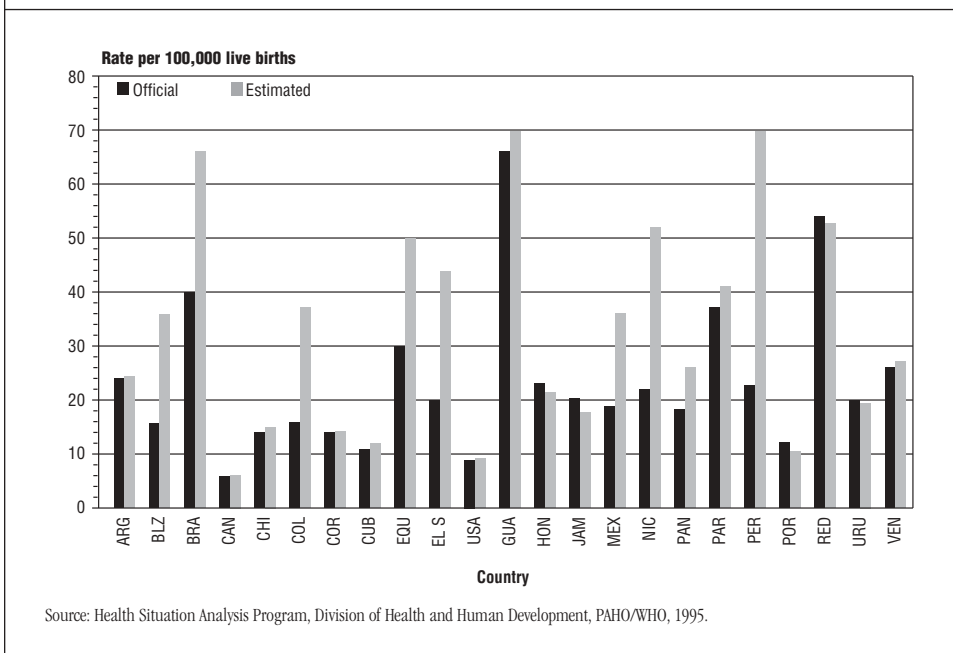
Source: ARI Data Base. Unit for Integrated Care for Common Childhood Diseases. Program for Communicable Diseases, PAHO/WHO.

**Figure 2.** Mortality from pneumonia and influenza in children 1 to 4 years of age. Countries of the Americas. Latest available information.



Source: Health Situation Analysis Program, Division of Health and Human Development, PAHO/WHO, 1995.

**Figure 3.** Reported versus estimated infant mortality in selected countries of the Americas. Latest available information.



If, as is estimated, eight countries have underreporting in excess of 100%, then the number of estimated deaths due to pneumonia and influenza would be boosted to 29,440, or by 19,135 deaths in excess of the official reports, 10,305 (Figure 4).

Even in some countries where underreporting is less serious, the estimates make it clear that a considerable number of deaths are not reported due to combined problems of underreporting and incorrect classification of cause of death. In the case of Brazil, with an estimated 57% underreporting of deaths in children under 1 and with 20% of the deaths recorded as “poorly defined,” the reported number of deaths from pneumonia and influenza is 9,001, but the estimated figure is 17,688, leaving a potential shortfall of 8,687 in the number of deaths reported (Figure 4).

Estimates for mortality from pneumonia and influenza available for 1994 peak at 31 deaths for each 1,000 live births (Haiti) in countries with overall infant mortality above 100 per 1,000 live births (Table 2).

The distribution for the estimated mortality from pneumonia and influenza in selected countries of the Americas (Figure 5) gives clear indication that it is a major problem in countries with high mortality, where these diseases are responsible for 3 of every 10 deaths in children under 5.

Thus, in Haiti, Peru, Bolivia, and Guatemala, where overall mortality in children under 5 is highest, pneumonia and influenza have the greatest causative effect. Other countries with lower

estimated mortality, such as Honduras, Brazil, Nicaragua, Ecuador, the Dominican Republic, Guyana, Paraguay, and El Salvador, also have elevated mortality from pneumonia and influenza.

By comparison, the countries with low mortality from pneumonia and influenza (Canada, United States, Cuba, Puerto Rico, and Costa Rica) also report low overall mortality, which shows how important is the control of these diseases in reducing infant mortality.

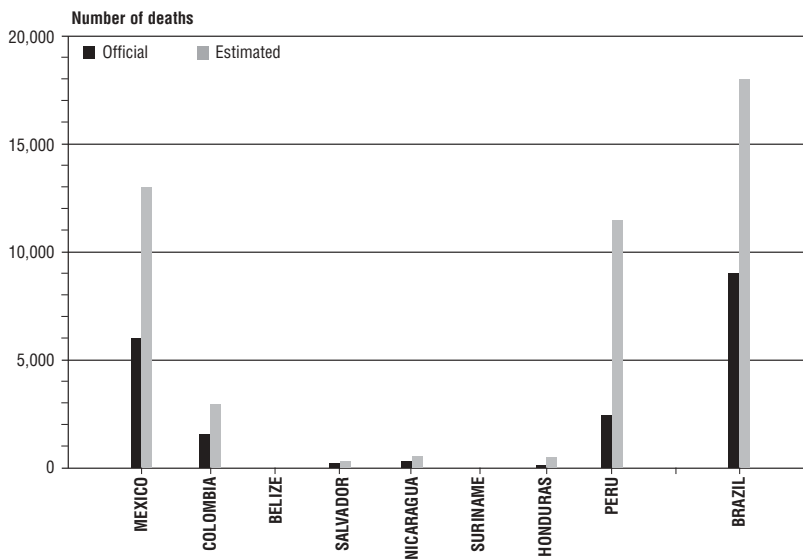
### III. PNEUMONIA AND INFLUENZA MORTALITY TRENDS

Mortality trends from pneumonia and influenza recorded in some countries of the Americas indicate that there have been few fluctuations in recent years.

As the problem evolved throughout the 1980s, greater differences tended to become more pronounced between the developing and the industrialized countries of the Region.

In children under 1 year, for example, whereas developing countries recorded declines in mortality from pneumonia and influenza at annual rates of 5 to 6% (Table 3 and Figure 6), many developing countries recorded declines below 3% annually, and Guatemala and Nicaragua even recorded increasing mortality throughout the decade. Although the increases may be associated with problems in how the information was recorded, the resulting trend can be characterized as stability or slight decline, much less than in industrialized countries.

**Figure 4.** Reported versus estimated mortality from pneumonia and influenza in children under 1 year of age in selected countries of the Americas. Latest available information.



Source: Health Situation Analysis Program, Division of Health and Human Development, PAHO/WHO, 1995.

**Table 2.** Mortality in children under 5 years of age. Total deaths and deaths from pneumonia and influenza. Estimates, circa 1994.

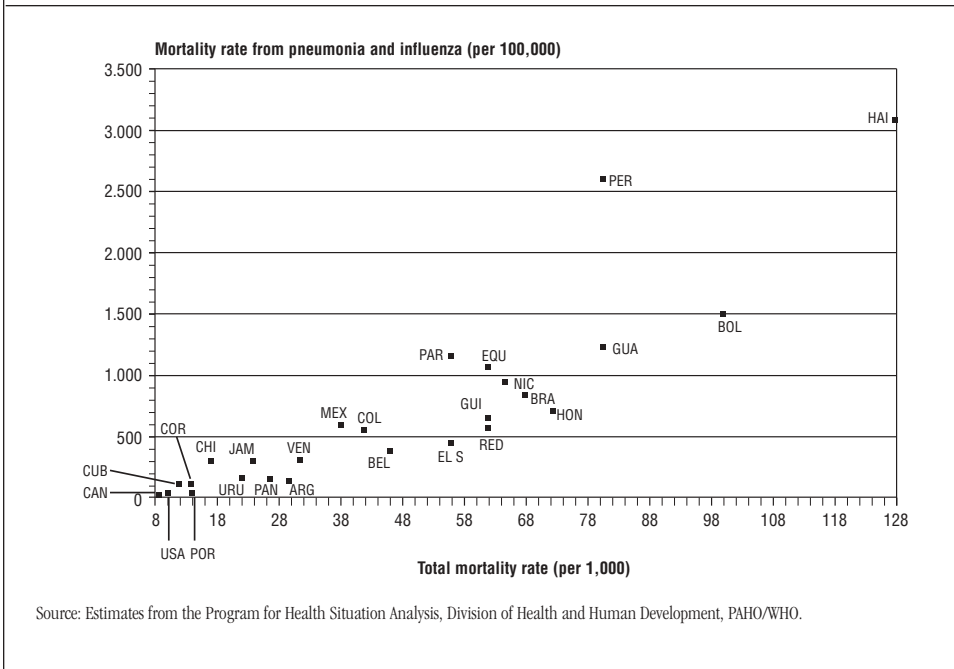
COUNTRY	UNDER 5 YEARS		UNDER 1 YEAR	
	Total	ARI	Total	Pneumonia & Influenza
ARGENTINA	30	150	26	117
BAHAMAS	21	168	19	154
BARBADOS	19	114	16	85
BELIZE	46	368	36	688
BOLIVIA	100	1,500	74	1,480
BRAZIL	67	804	57	467
CANADA	8	16	7	8
CHILE	17	238	14	227
COLOMBIA	42	546	32	358
COSTA RICA	14	112	12	119
CUBA	12	108	10	82
DOMINICAN REPUBLIC	62	558	48	245
ECUADOR	62	1,054	44	392
EL SALVADOR	56	392	43	176
GUATEMALA	81	1,215	51	903
GUYANA	62	620	46	345
HAITI	128	3,072	98	2,352
HONDURAS	73	657	44	264
JAMAICA	23	253	17	139
MEXICO	37	555	30	450
NICARAGUA	64	960	53	504
PANAMA	27	162	21	116
PARAGUAY	56	1,288	42	563
PERU	83	2,573	59	1,251
PUERTO RICO	14	42	12	79
ST KITTS & NEVIS	32	256	27	95
ST VINCENT & THE GRENADINES	23	138	18	61
ST LUCIA	23	161	19	72
SURINAME	40	320	31	171
TRINIDAD AND TOBAGO	22	264	17	143
UNITED STATES	10	30	8	14
URUGUAY	22	176	19	80
VENEZUELA	31	248	26	161

Note: ARI according to International Classification of Diseases (ICD-9a), codes 460-466 and 480-487; pneumonia and influenza, ICD-9, codes 480-487.

Remarks:

- \* Estimates of mortality in infants and in children under 5 (both per 1,000 live births) were calculated by the Health Situation Analysis Program, Division of Health and Human Development, PAHO/WHO.
- \* Estimates of mortality from ARI in children under 5 (per 100,000 inhabitants 1 to 4 years old) were based on the estimates of mortality and the percentage of recorded deaths from ARI in this cohort for the latest available year from 1988 to 1993.
- \* Estimates of mortality from pneumonia and influenza in children under 1 (per 100,000 live births) were based on the estimates of infant mortality and the percentage of recorded deaths from pneumonia and influenza in this cohort for the last available year.

**Figure 5.** Ratio between total mortality and mortality from pneumonia and influenza in children under 5 in selected countries of the Americas, circa 1994.



As a result of this situation, historical comparisons show the differences between the industrialized and developing countries grew throughout the 1980s. Whereas in 1980 mortality from pneumonia and influenza in Guatemala was similar to that recorded in Canada 50 years earlier, by the end of the decade it was similar to what had existed in Canada at least 60 years earlier.

The early 1990s, however, ushered in new expectations for the pattern of mortality from pneumonia and influenza (Table 4 and Figure 7). Some developing countries recorded important annual declines. Nicaragua (where mortality from pneumonia and influenza in children under 1 rose during the 1980s) saw an annual decline of 9% from 1990 to 1995. Similarly, in Brazil this mortality declined 16% annually between 1990 and 1992.

Even though these figures will have to be adjusted as further information becomes available, they show that the panorama has been changing since the 1980s (3, 4, 5).

#### IV. IMPORTANCE OF ARI AS A CAUSE OF DISEASE

The data required to estimate the importance of ARI as a cause of disease in children under 5 are scarce and difficult to obtain, and there are greater problems in the collection and analysis of data for morbidity than for mortality.

**Table 3.** Trends in mortality from pneumonia and influenza<sup>1</sup> in children under 5. Countries of the Americas, 1980 to 1990 or latest year available, before 1990.<sup>2</sup>

COUNTRY	Year	No.	Rate	Year	No.	Rate <sup>3</sup>	% Annual Decrease <sup>4</sup>
ARGENTINA	1980	1,889	270.7	1990	704	103.7	6.17
BELIZE	1980	38	606.6	1989	5	113.4	9.03
BRAZIL	1980	17,488	327.7	1990	10,799	299.5	0.86
CANADA	1980	82	22.2	1990	26	6.4	7.12
CHILE	1980	1,077	436.0	1990	739	240.3	4.49
COLOMBIA	1980	3,825	455.8	1990	1,452	162.7	6.43
COSTA RICA	1980	154	220.0	1990	109	133.0	3.95
CUBA	1980	221	161.4	1990	165	88.4	4.52
DOMINICAN REPUBLIC	1980	269	139.6	1990	230	103.5	2.59
ECUADOR	1980	1,455	553.7	1990	779	309.9	4.40
EL SALVADOR	1981	292	178.8	1990	254	171.2	0.47
GUATEMALA	1980	4,035	1,325.2	1990	4,206	1,559.6	-1.77
HONDURAS	1980	217	139.2	1981	222	137.9	0.93
JAMAICA	1983	117	190.4	1985	104	179.3	2.91
MEXICO	1980	18,854	770.7	1990	10,122	370.0	5.20
NICARAGUA	1983	360	323.15	1990	547	536.0	-9.41
PANAMA	1980	80	152.0	1990	45	75.1	5.06
PARAGUAY	1980	399	887.0	1990	244	378.3	5.74
PERU	1980	4,349	628.1	1990	2,802	447.6	2.87
PUERTO RICO	1980	91	124.6	1990	35	52.7	5.77
SURINAME	1980	12	121.9	1990	8	72.7	4.04
UNITED STATES	1980	1,012	30.0	1990	634	15.3	4.90
URUGUAY	1980	85	157.8	1990	75	129.7	1.78
VENEZUELA	1980	944	191.5	1990	941	162.8	1.50

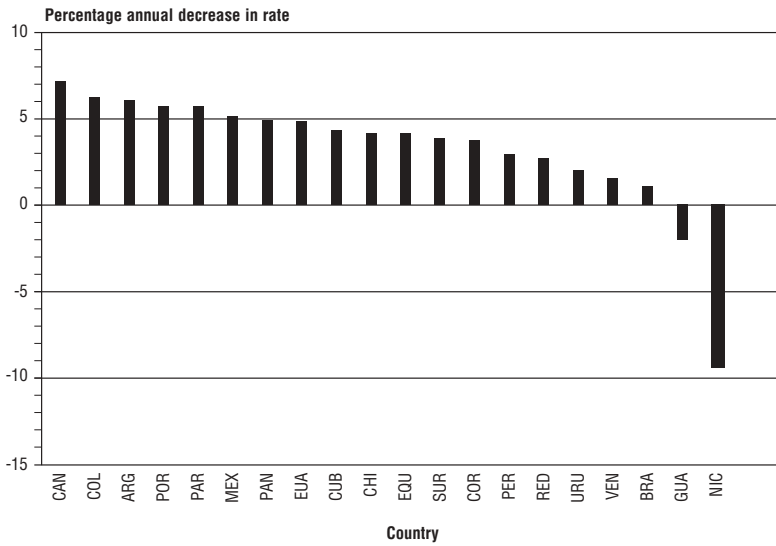
1 Corresponds to codes 480-487 in the ICD 9a revision.

2 Time frame includes latest available information prior to 1990 for countries without data for that year.

3 Rate per 100,000 live births.

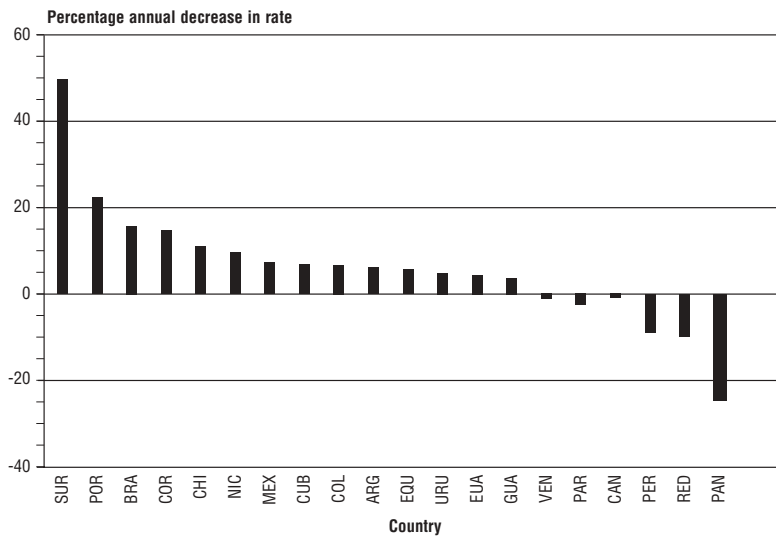
4 Percentage of decrease recorded between 1980 and 1990 or latest available year. Negative numbers indicate mortality increased since 1980. Countries omitted were missing records for 1 or more years, recorded no change in mortality, or did not record mortality in 1980 but did in 1990.

**Figure 6.** Evolution of mortality from pneumonia and influenza in children under 1 in countries of the Americas. Latest available information.



Note: Negative numbers indicate an increase in mortality from pneumonia and influenza.

**Figure 7.** Evolution of mortality from pneumonia and influenza in children under 1 in countries of the Americas. 1990 to the last available year.



Note: Negative numbers indicate an increase in mortality from pneumonia and influenza since 1990.

The existing systems of information established to organize the registration, relay, and collection of morbidity data are geared toward the epidemiological surveillance of specific diseases considered highly contagious (meningitis, cholera, measles) or diseases that are targeted by special programs (poliomyelitis, neonatal tetanus). Furthermore, existing records in local health services reflect serious problems with coverage and diagnostic quality; not all cases attended are recorded, clinical criteria vary, and laboratory confirmation is often absent.

Thus, the most reliable information available on the importance of ARI as a cause of disease is derived from community-based surveys. Even with all of these weaknesses, the information from health centers and hospitals still offers a general idea of the importance of the problem as a basis for medical visits and hospital admissions involving children under 5 in developing countries (6).

## V. COMMUNITY-BASED STUDIES

ARI are the most common health disorders affecting children under 5. Many studies demonstrate the important incidence of ARI in children of this age in both developing and industrialized countries with almost the same incidence for both. Differences do appear, however, between rural and urban areas. Studies from industrialized countries demonstrate a far lower incidence of pneumonia than is found in developing countries. The fact that a much greater share of the pneumonia cases in developing countries are due to bacterial causes, as compared to industrialized countries where viruses are more commonly the cause, helps to explain the higher mortality from pneumonia recorded in developing countries (7-11).

Some surveys of mothers conducted in recent years in developing countries have indicated that between 13 and 30% of their children under 5 had suffered bouts of coughing and respiratory difficulty in the 2 weeks prior to the interviews (Figure 8).

Studies conducted in Colombia and Haiti showed similar figures for children under 2 months old; 23% had suffered these kinds of bouts in the previous 2 weeks. By contrast, a study in Bolivia indicated a far smaller proportion, 13%. The highest proportions (over 25%) were found in Colombia and Haiti in children from 6 to 24 months.

The three studies coincided in making clear that ARI occurs in children under 5 with extreme frequency and represents one of the major health problems of children.

## VI. INFORMATION FROM HEALTH SERVICE RECORDS

The elevated frequency of ARI in the first 5 years of children's lives also explains the important role of these diseases in medical visits and hospital admissions in developing countries.

ARI was the basis for 70% of medical visits for children under 6 months in Peru in 1992 and 60% of the visits for children 6 to 11 months and 1 to 4 years (Figure 9). The bulk of these visits was for flu, common cold, and respiratory disorders other than pneumonia. Pneumonia was

**Table 4.** Trends in mortality from pneumonia and influenza<sup>1</sup> in children under 5. Countries of the Americas, 1990 to latest available year.<sup>2</sup>

COUNTRY	Year	No.	Rate <sup>3</sup>	Year	No.	Rate <sup>3</sup>	% Annual Decrease <sup>4</sup>
ARGENTINA	1990	704	103.74	1994	560	83.11	4.97
BRAZIL	1990	10,799	299.46	1993	5,534	152.00	16.41
CANADA	1990	26	6.41	1992	26	6.52	-0.86
CHILE	1990	739	240.31	1994	36	127.72	11.71
COLOMBIA	1990	1,452	162.67	1991	1,367	152.68	6.14
COSTA RICA	1990	109	133.03	1994	48	59.71	13.78
CUBA	1990	165	88.40	1995	87	59.23	6.60
DOMINICAN REPUBLIC	1990	230	103.48	1995	141	151.73	-9.33
ECUADOR	1990	779	309.94	1994	742	250.91	4.76
EL SALVADOR	1990	254	171.20				
GUATEMALA	1990	4,206	1,559.64	1993	4,206	1,439.14	2.58
HONDURAS	1981	222	137.90				
JAMAICA	1985	104	179.31				
MEXICO	1990	10,122	369.97	1994	7,687	264.70	7.11
NICARAGUA	1990	547	536.02	1995	178	291.74	9.11
PANAMA	1990	45	75.12	1993	77	130.09	-24.39
PARAGUAY	1990	244	378.28	1993	308	399.43	-1.86
PERU	1990	2,802	447.60	1992	3,275	525.77	-8.73
PUERTO RICO	1990	35	52.70	1992	20	29.50	22.01
SURINAME	1990	8	72.73	1991	4	36.36	50.01
UNITED STATES	1990	634	15.25	1991	607	14.77	3.15
URUGUAY	1990	75	129.70	1994	66	106.10	4.55
VENEZUELA	1990	941	162.81	1993	875	166.86	-0.83

1 Corresponds to ICD-9, codes 480-487.

2 Latest information communicated by authorities in each country responsible for ARI to the ARI/CDD Unit of PAHO/WHO, Washington, D.C.

3 Rates per 100,000 live births.

4 Percentage decrease since 1990. Negative figures indicate increases in mortality. Indicator is not calculated for countries without post-1990 data.

the basis for only 5.8% of all medical visits of children under 6 months, 7.6% of children from 6 to 11 months, and 7.2% of children from 1 to 4 years (12).

Pneumonia, which is responsible for 8 to 9 of every 10 deaths from ARI in children under 5, represents only 8 to 12% of ARI-based medical visits for this age group.

ARI also play an important role in the hospitalizations of children under 5 in developing countries. During 1992 in Ecuador ARI was responsible for 27.6% of the hospitalizations involving children under 1 year and 24.5% for children between 1 and 4 years (Figure 10).

Available data from Mexico for 1990 (Figure 11) demonstrate that ARI is responsible for a similar proportion of hospitalizations for children under 1, with 21.9%, but a larger proportion of those involving children between 1 and 4 years (43.7%). The role of pneumonia in hospitalizations for ARI is far greater than in medical visits for ARI. In 1990 pneumonia was responsible for 32.7% of the ARI hospitalizations of children under 1 and 24.4% of hospitalizations involving children between 1 and 4 years.

Other infections of the respiratory tract, such as bronchiolitis, and the upper respiratory tract, such as tonsillitis, sinusitis, and otitis, also account for ARI hospitalizations (13-15).

## VII. PREVALENCE OF RISK FACTORS

Comparisons between the situation of mortality and morbidity from pneumonia and influenza in the developing countries and the situation in industrialized countries highlight the differences in prevalence of risk factors for severe and other types of pneumonia.

The risk factors of greatest importance—which include high prevalence of low birth weight, malnutrition, absence or short duration of breast-feeding, low immunization rates, especially against measles and whooping cough, and indoor air pollution due to the use of biomass fuel for eating and cooking food—are all associated with greater frequency and severity of ARI episodes in children under age 5.

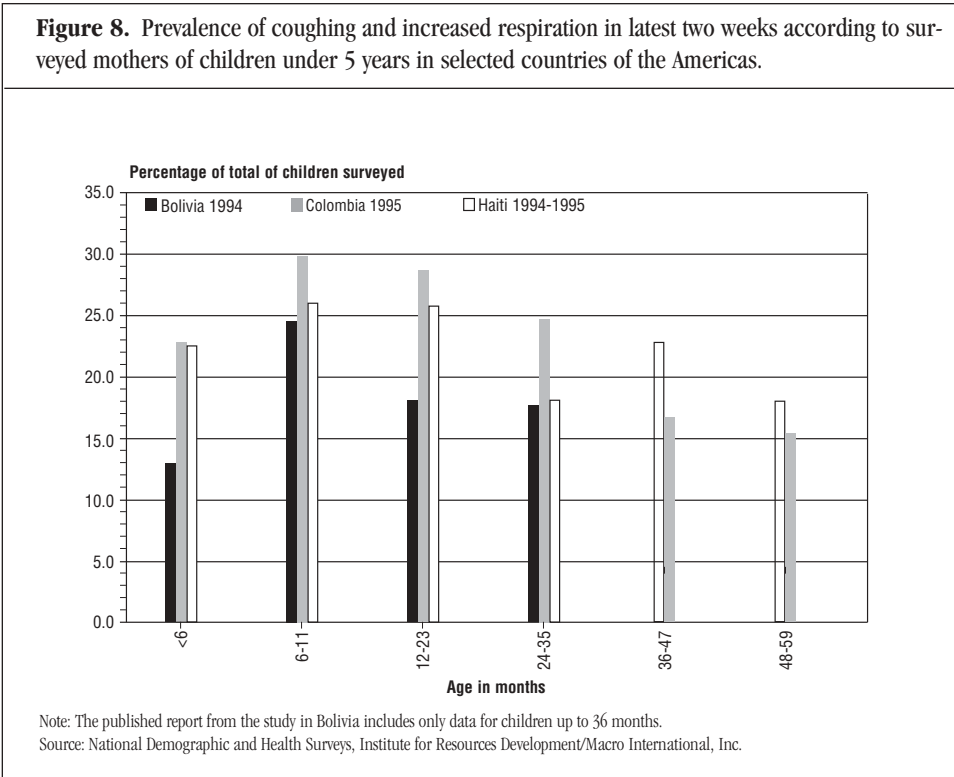
All of these factors involve the child's biological defenses (whether natural or acquired) and make the child more susceptible to superinfection by bacteria. They also exacerbate the episodes of ARI that affect children under 5 just as frequently but less severely in industrialized countries.

Moreover, the lack of access to health care and certain cultural norms of the population in relation to caring for the small child mean that many children with ARI do not receive health care at home or are not taken to health care centers.

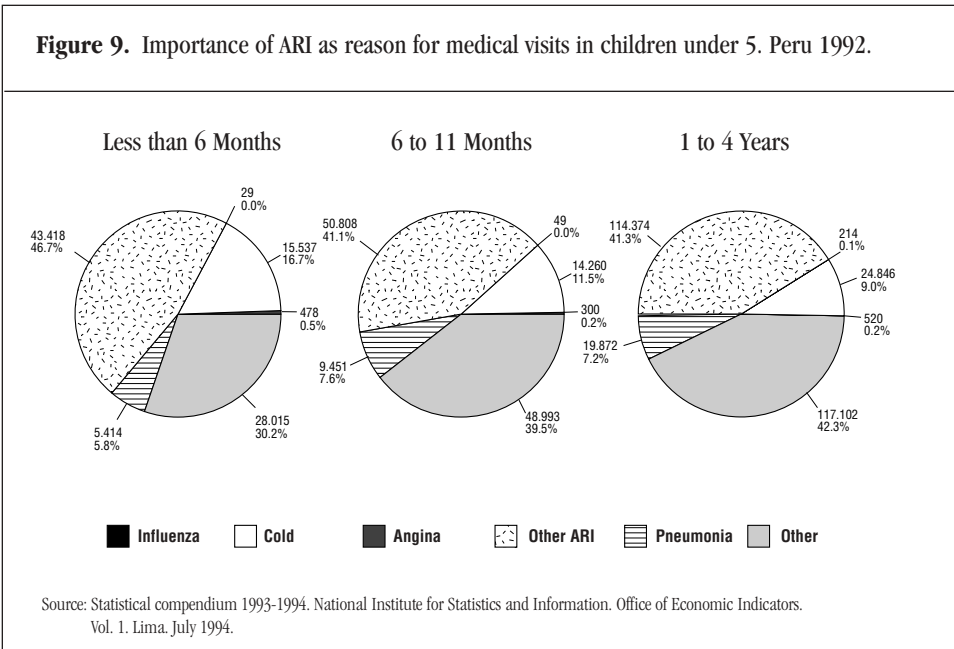
The lack of access among large sectors of the population comes from an absence of health services and personnel, problems of geographical distance in reaching services, short attending hours, and constant or frequent lack of drugs to treat pneumonia.

Because the decision of when to seek health care for a child depends on the parents, their understanding and attitudes toward ARI are critical. In the two community-based surveys cited above, for example, evaluations were made of the search by parents for care for their children when they suffered bouts of ARI (Table 12).

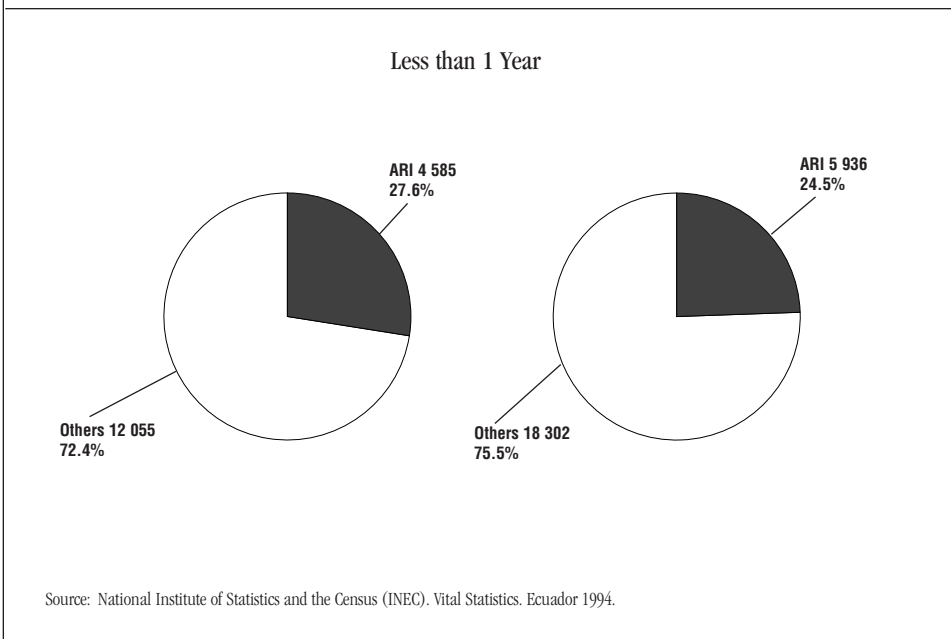
**Figure 8.** Prevalence of coughing and increased respiration in latest two weeks according to surveyed mothers of children under 5 years in selected countries of the Americas.



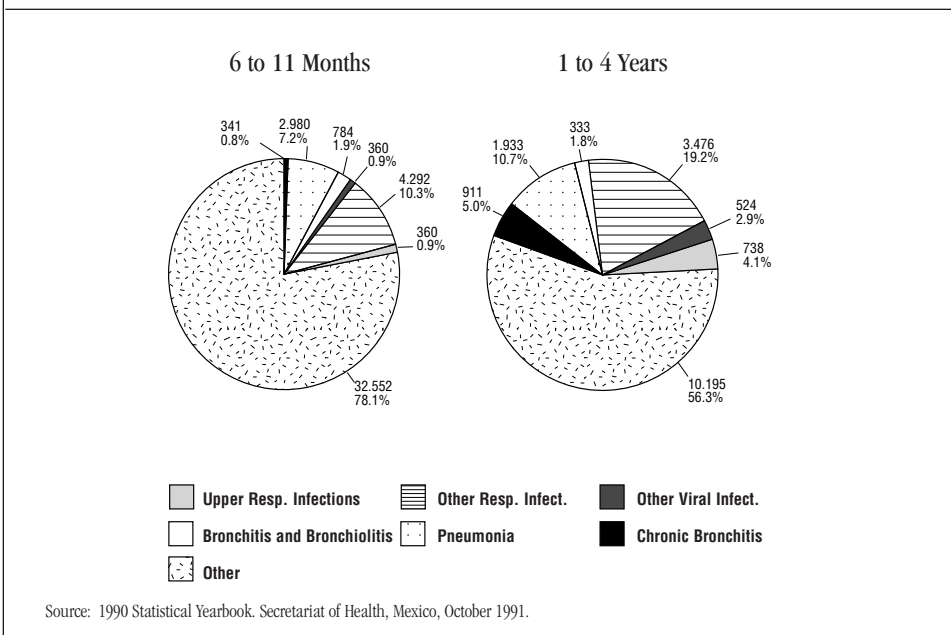
**Figure 9.** Importance of ARI as reason for medical visits in children under 5. Peru 1992.



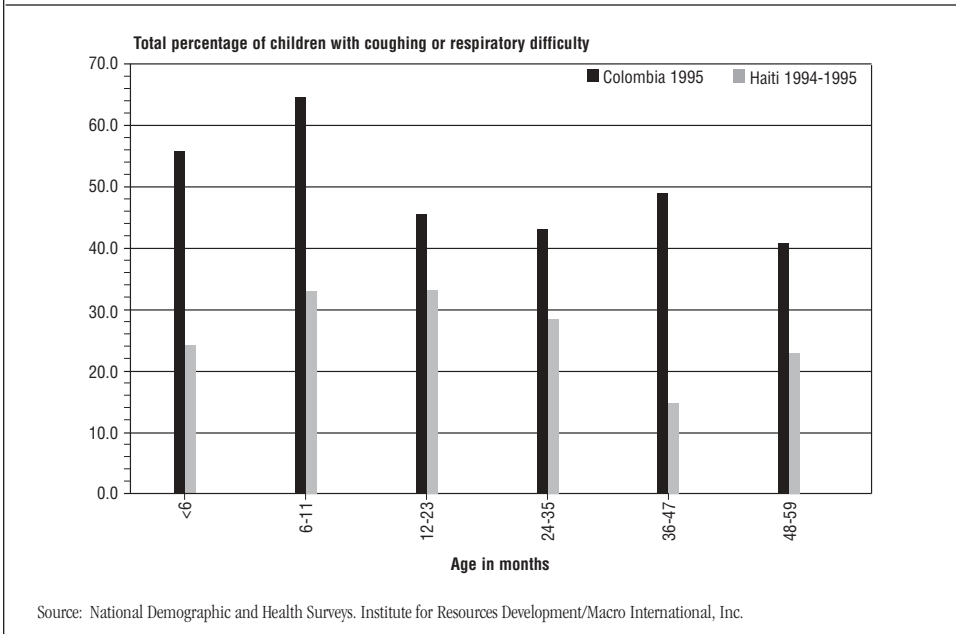
**Figure 10.** Importance of ARI as reason for hospitalizations. Ecuador, 1993.



**Figure 11.** Importance of ARI as reason for hospitalizations. Mexico, 1990.



**Figure 12.** Percentage of children under 5 with coughing or respiratory difficulty who had medical visits in Colombia and Haiti.



A comparison between Colombia and Haiti shows children with ARI are attended with far greater frequency in Colombia (65% of the children from 6 to 11 months and 41% between 4 and 5 years) than in Haiti (34% of the children 1 to 2 years and 16% of those 3 to 4 years).

These differences, which reflect parents' decisions and their access to health care, are closely associated with severe morbidity and mortality from pneumonia in children under 5.

## VIII. PERSPECTIVES ON ARI CONTROL IN COUNTRIES OF THE REGION

The importance of ARI as a cause of disease and death in children under 5 underlies the high priority given in recent years by developing countries in the Region to the efforts to control ARI.

PAHO/WHO proposed standard case management as a control strategy. It includes a set of criteria for evaluation, classification, and treatment of ARI cases that can be used in primary care by medical or non-medical personnel.

The signs proposed for the evaluation of children under 5 with ARI attended at health centers have the highest predictive value according to the latest international research. The proposals of drugs for treatment take into consideration the sensitivity of the major pneumonia-causing bacteria in children in most developing countries.

ARI standard case management has been proven effective in preventing approximately 40% of the overall deaths from bacterial pneumonia that take place in developing countries, where infant mortality of 40 or more per 1,000 live births is recorded and where bacterial pneumonia is considered to represent a major proportion of the overall pneumonia.

In the developing countries of the Region ARI standard case management has already reduced the frequency of severe bouts of pneumonia and hospital case fatality (17).

The incorporation of ARI standard case management into the strategy of Integrated Management of Childhood Illnesses (IMCI) will contribute significantly to the appropriate screening, diagnosis, and treatment of ARI in children under 5.

The IMCI strategy takes the evaluation criteria used for a child with ARI and incorporates them into the evaluation of any sick child who presents for medical care. In this fashion many children can be properly screened and treated when they have incipient signs of pneumonia, such as coughing or respiratory difficulty, that often go undetected in the health services because the children have been brought to be attended for other diseases.

The evaluation of other common causes of disease in children (diarrhea, skin problems, nutritional disorders), vigorous prevention efforts (control of vaccination schedule and vaccination of children with incomplete schedules, assessment of nutritional status), and efforts to improve mothers' education will all contribute to the reduction of infant mortality associated with other health problems (measles, diarrhea, malnutrition). All these efforts are incorporated into the IMCI strategy and will greatly benefit children's health.

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